AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.2.1.3

Current, resistance and potential difference

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**18**
Available paper years	**2018–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

6.2.1.3 Current, resistance and potential difference

Answer 01 · Mark scheme

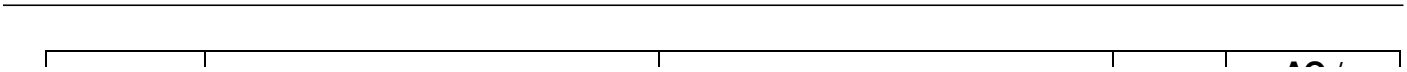
June 2018 | 8464/P/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	the store of chemical energy in the battery has reduced		1	AO1 6.2.4.2
02.2		an answer of 7.254 scores **2** marks		
	P = 3.90 × 1.86		1	AO2 6.2.4.1
	P = 7.254	allow 7.25 or 7.3	1	AO2 6.2.4.1
	W		1	AO1 6.2.4.1
02.3	**comparison with compact power source**			AO3 6.2.4.2
	5 times as many charges		1	
	(only) twice the mass	allow (only) twice as heavy as the compact	1	
	comparison with the high capacity power source			
	although half the number of charges		1	
	(only) one third the mass	allow (only) a third as heavy as the high capacity	1	
	or			
	calculation of charge / mass ratio for large power source	allow mass / charge ratio		
	$= \frac{5}{200}$ (1)	$= \frac{200}{5}$		
	= 0.025 (1)	allow 40		
	calculation of charge / mass ratio for high capacity and compact power sources (1)	allow mass / charge ratio		
	charge / mass ratio greatest for large source (1)	allow lowest mass / charge ratio		
Total			**8**	

6.2.1.3 Current, resistance and potential difference

Answer 01 · Mark scheme

June 2018 | 8464/P/1F | Original Q2



6.2.1.3 Current, resistance and potential difference

Answer 02 · Mark scheme

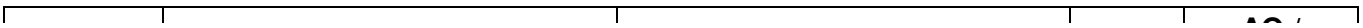
June 2018 | 8464/P/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	(casing is) not made of metal little / no chance of electric shock	allow (casing is) made of plastic allow they are double insulated	1 1	AO3 6.2.3.2
04.2	charge flow = current × time	allow the equation given in symbols	1	AO1 6.2.1.2
04.3	Q = 2.95 × 60 Q = 177 (C)	an answer of 177 scores **2** marks allow 180 (C)	1 1	AO2 6.2.1.2
04.4	straight line with a different positive gradient straight line with positive gradient through the origin	must go through the first and third quadrant	1 1	AO1 6.2.1.4
04.5			1	AO1 6.2.1.1
04.6	the particles vibrate about a fixed position regular arrangement (the particles change) to being free to move around	allow the particles are in a regular arrangement allow correct description of translational kinetic energy	1 1	AO1 6.3.1.1
04.7	 L = 200 000 (J/kg) E = 500 × 200 000 E = 100 000 000 (J)	an answer of 100 000 000 scores **3** marks allow 1×10^8 (J) allow correct calculation for incorrect conversion or no conversion of L for **2** marks	 1 1 1	AO2 6.3.2.3
Total			**13**	

6.2.1.3 Current, resistance and potential difference

Answer 02 · Mark scheme

June 2018 | 8464/P/1F | Original Q4



6.2.1.3 Current, resistance and potential difference

Answer 03 · Mark scheme June 2019 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
01.1	LED		1	AO1.1 AO1 in isolation 6.2.1.1	A
01.2	the same as		1	AO1.1 6.2.1.2	G
01.3	 1500 – 900 600 (thousand)	an answer of 600 (thousand) or 600 000 scores **2** marks two correct readings from the graph scores **1** mark allow a range of 1480 to 1520 and a range of 880 to 920 allow an answer in the range of 560 (thousand) to 640 (thousand) consistent with their allowed readings	 1 1	AO2.2 6.2.1.2 WS 3.2	G
01.4	repeat the experiment using exactly the same method		1	AO3.3a 6.2.1.2	A
01.5	 power = 0.80 × 0.020 power = 0.016 (W)	an answer of 0.016 (W) scores **2** marks	 1 1	AO2.1 6.2.4.1 WS 3.3	E
01.6	power = (current)^2 × resistance		1	AO1.1 AO1 in isolation 6.2.4.1	A
01.7	temperature increases		1	AO1.1 6.1.1.1	E

6.2.1.3 Current, resistance and potential difference

Answer 03 · Mark scheme

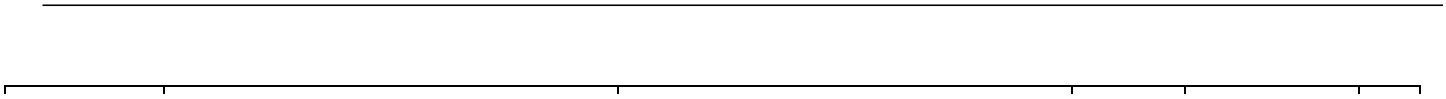
June 2019 | 8464/P/1F | Original Q1

01.8	Q = 0.020 × 180 Q = 3.6 (C)	an answer of 3.6 (C) scores **2** marks	1 1	AO2.1 6.2.1.2 WS 3.3	E
Total			**11**		

6.2.1.3 Current, resistance and potential difference

Answer 03 · Mark scheme

June 2019 | 8464/P/1F | Original Q1



6.2.1.3 Current, resistance and potential difference

Answer 04 · Mark scheme June 2019 | 8464/P/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
02.1	the brightness of the lamp		1	AO3/3a 6.1.3c WS 2.2	A
02.2	zero error		1	AO3/3b 6.1.3c WS 3.7	A
02.3	C		1	AO3/1b 6.1.3c WS 3.7	A
02.4	10.0	allow 10	1	AO3/1a 6.1.3c WS 3.5	G
02.5	$\frac{0.96}{8.0}$ = 0.12	an answer of 0.12 or 12% scores **2** marks allow 12%	1 1	AO2.1 6.1.2.2	E
02.6	replenished		1	AO1.1 in isolation 6.1.3b	G
02.7	E = 490 × 31 E = 15 190 E = 15 000 (J)	an answer of 15 000 (J) scores **3** marks allow 15 200 if correct substitution is seen allow an answer to 2 s.f. consistent with their calculated value of E using E=QV	1 1 1	AO2.1 6.2.4.2	E

6.2.1.3 Current, resistance and potential difference

Answer 04 · Mark scheme

June 2019 | 8464/P/1F | Original Q2

02.8	less fossil fuel is burned		1	AO3.2a 6.1.3e	A
Total			**11**		

6.2.1.3 Current, resistance and potential difference

Answer 04 · Mark scheme

June 2019 | 8464/P/1F | Original Q2



6.2.1.3 Current, resistance and potential difference

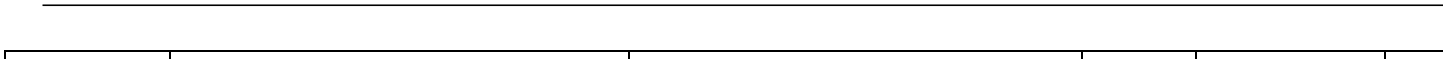
Answer 05 · Mark scheme June 2019 | 8464/P/1F | Original Q6

06.1	ammeter in series with the resistor, voltmeter in parallel with the resistor		1	AO1/1 6.2.1.4 RP 16 WS 2.4	A
06.2	current decreased	ignore slows down	1	AO1/1 6.2.1.3 RP 16 WS 3.6	E
06.3	reverse the connections to the cell	allow battery for cell allow reverse the cell	1	AO1/2 6.2.1.3 RP 16 WS 2.2	E
06.4	(directly) proportional	do not allow inversely proportional do not allow indirectly proportional	1	AO1/2 6.2.1.3 RP 16 WS 3.5	G
06.5	potential difference = current × resistance **or** V=IR	allow voltage for potential difference allow any correct re-arrangement	1	AO1/1 6.2.1.3 RP 16 WS 3.3	E
06.6	 3.0 = 0.12 × R $R = \frac{3.0}{0.12}$ R = 25 (Ω)	an answer of 25 (Ω) scores **3** marks	 1 1 1	AO2/1 6.2.1.3 RP 16 WS 3.3	E
Total			**8**		

6.2.1.3 Current, resistance and potential difference

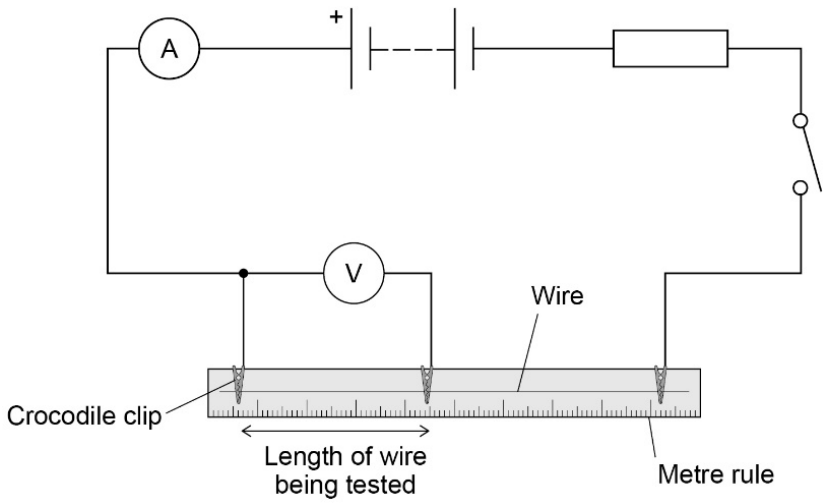
Answer 05 · Mark scheme

June 2019 | 8464/P/1F | Original Q6



6.2.1.3 Current, resistance and potential difference

Answer 06 · Mark scheme November 2020 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	both symbols correct and in the correct position  		1	AO1 6.2.1.3 6.2.1.4 RPA 15
01.2	the length of the wire being tested		1	AO1 6.2.1.3 RPA 15
01.3	the resistance of the wire		1	AO1 6.2.1.3 RPA 15
01.4	mean p.d. = $\frac{0.16 + 0.17 + 0.15}{3}$ mean p.d. = 0.16 (V)		1 1	AO2 6.2.1.3 RPA 15
01.5	R = 0.32/0.50 R = 0.64 (Ω)		1 1	AO2/1 6.2.1.3 6.2.1.3 RPA 15

6.2.1.3 Current, resistance and potential difference

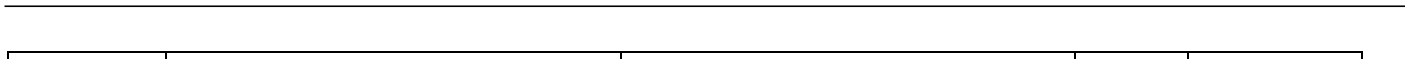
Answer 06 · Mark scheme

01.6	power = 0.32 × 0.50 power = 0.16 (W)		1 1	AO2 6.2.4.1
01.7	charge flow = 0.50 × 17 8.5 (C)		1 1	AO2 6.2.1.2
01.8	a straight line through the origin with a lower gradient		1	AO1/2 6.2.1.3 RPA 15
Total			**12**	

6.2.1.3 Current, resistance and potential difference

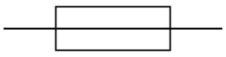
Answer 06 · Mark scheme

November 2020 | 8464/P/1F | Original Q1



6.2.1.3 Current, resistance and potential difference

Answer 07 · Mark scheme November 2020 | 8464/P/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	swap the blue wire and the green and yellow wire	allow connect the blue wire to the neutral pin and the yellow and green wire to the earth pin. allow swap the earth and neutral wires ignore the earth wire and neutral wire are wrongly connected	1	AO2 6.2.3.2
05.2	230 (V) 50 (Hz)		1 1	AO1 6.2.3.1 6.2.3.2
05.3	0 (V)		1	AO1 6.2.3.2
05.4			1	AO1 6.2.1.1
05.5	the person could get an electric shock because there is a current in the person	allow so the person could be electrocuted allow because the person provides a connection (from the washing machine) to earth allow because there is a potential difference across the person	1 1	AO3 6.2.3.2

6.2.1.3 Current, resistance and potential difference

Answer 07 · Mark scheme

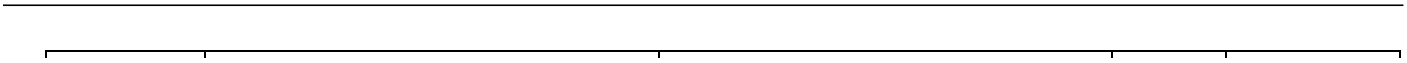
November 2020 | 8464/P/1F | Original Q5

05.6	the charge flows through the earth wire (instead of the person) because the resistance of the earth wire is much less than that of a person	 allow so the case does not become live allow so the fuse will break / melt / blow	1 1	AO3 6.2.3.2
Total			**9**	

6.2.1.3 Current, resistance and potential difference

Answer 07 · Mark scheme

November 2020 | 8464/P/1F | Original Q5



6.2.1.3 Current, resistance and potential difference

Answer 08 · Mark scheme November 2021 | 8464/P/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1			1	AO1 6.2.1.1
03.2	the flow of electrical charge		1	AO1 6.2.1.2
03.3	all 4 components connected in a series circuit	allow a cell instead of a battery allow an LED or LDR symbol instead of a lamp ignore the + sign on the battery symbol	1	AO3 6.2.1.1 6.2.2
03.4	decrease the resistance of the variable resistor		1	AO1 6.2.1.3
03.5	P = 0.75 × 0.16 P = 0.12 (W)		1 1	AO2 6.2.4.1
03.6	charge flow = current × time Q = It		1	AO1 6.2.1.2

6.2.1.3 Current, resistance and potential difference

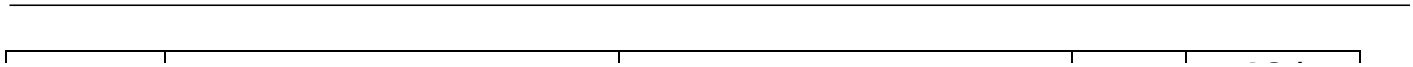
Answer 08 · Mark scheme

03.7	200 mA = 0.2 A charge flow = 0.2 × 15 charge flow = 3.0 (C)	 allow a correct substitution using an incorrectly/not converted value for current allow a correct calculation using an incorrectly/not converted value for current	1 1 1	AO2 6.2.1.2
03.8	1.6		1	AO3 6.2.1.2
03.9	260 mA to 380 mA		1	AO2 6.2.1.2
Total			**12**	

6.2.1.3 Current, resistance and potential difference

Answer 08 · Mark scheme

November 2021 | 8464/P/1F | Original Q3



6.2.1.3 Current, resistance and potential difference

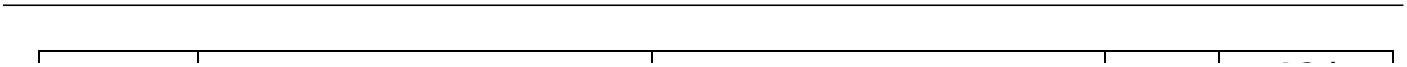
Answer 09 · Mark scheme November 2021 | 8464/P/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	$V = I\ R$		1	AO1 6.2.1.3
05.2	3.9 = 0.12 × R $R = \frac{3.9}{0.12}$ R = 32.5 (Ω)	 allow R = 33 (Ω)	1 1 1	AO2 6.2.1.3
05.3	energy = power × time **or** E = P t		1	AO1 6.2.4.2
05.4	time = 150 000s energy = 0.46 × 150 000 energy = 69 000 (J)	 allow a substitution using an incorrectly/not converted value of time allow a correct calculation using an incorrectly/not converted value of time	1 1 1	AO2 6.2.4.2
05.5	thermistor		1	AO1 6.2.1.1
05.6	the current will increase (because) the resistance decreases		1 1	AO1 6.2.1.4
Total			**11**	

6.2.1.3 Current, resistance and potential difference

Answer 09 · Mark scheme

November 2021 | 8464/P/1F | Original Q5



6.2.1.3 Current, resistance and potential difference

Answer 10 · Mark scheme

November 2021 | 8464/P/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	more than 10 000 times bigger		1	AO1 6.4.1.1
06.2	the atom becomes a positive ion the atom loses an electron		1 1	AO1 6.4.1.2
06.3	beta radiation is only weakly ionising		1	AO3 6.4.2.1

Question	Answers	Mark	AO / Spec. Ref.
06.4	**Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.	5–6	AO3 6.4.2.1
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3–4	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content	0	
	Indicative content • move the detector very close to the source • record the count rate • position the paper between the source and the detector • record the new count rate • alpha radiation will not penetrate through paper • if the count rate with the paper is (significantly) less than without then the source emits alpha radiation • remove the paper and position the aluminium between the source and the detector • record the new count rate • (alpha and) beta radiation will not penetrate through the aluminium • if the count rate has (significantly) reduced compared with using paper then beta radiation is present • if radiation penetrates through the aluminium then gamma radiation is present • the experiment should be repeated and mean results calculated because radioactivity is a random process To access level 3, the candidate must use the paper sheet, the aluminium sheet and no sheet, and describe how the results would indicate the presence of alpha, beta or gamma radiation.		
Total		**10**	

6.2.1.3 Current, resistance and potential difference

Answer 11 · Mark scheme

June 2022 | 8464/P/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	battery		1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	variable resistor	allow resistor allow battery / cells allow correct circuit symbol	1	AO1 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	subtract 0.4 volts from each reading		1	AO1 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	mean $= \frac{0.54+0.58+0.53}{3}$ mean = 0.55 (A)	allow mean $= \frac{1.65}{3}$	1 1	AO2 6.2.1.3

6.2.1.3 Current, resistance and potential difference

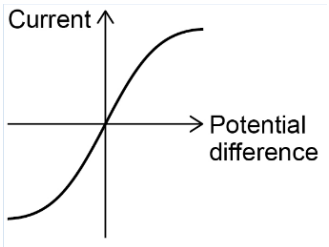
Answer 11 · Mark scheme

June 2022 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	$P = 4.8 \times 0.75$ $P = 3.6$ (W)		1 1	AO2 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	$R = \frac{4.8}{0.75}$ $R = 6.4$ (Ω)		1 1	AO2 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	increase increase		1 1	AO1 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.8			1	AO1 6.2.1.4

Total Question 1		12

6.2.1.3 Current, resistance and potential difference

Answer 12 · Mark scheme

June 2023 | 8464/P/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1			1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	charge		1	AO1 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	place the component / thermistor in the water / beaker		1	AO3 6.2.1.4
	record the temperature (of the water) using the thermometer	allow place the thermometer in the water / beaker and record the temperature	1	
	record / measure the resistance (using the resistance meter)		1	
	change the temperature of the water (using the kettle) and repeat the measurements (of temperature and resistance)		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	non-linear		1	AO1 6.2.1.4

6.2.1.3 Current, resistance and potential difference

Answer 12 · Mark scheme June 2023 | 8464/P/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	(resistance changes from) 200 (Ω) to 80 (Ω) change in resistance = 120 (Ω)		1 1	AO2 6.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	power = potential difference × current or $P = V I$		1	AO1 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	$2900 = 230 \times I$ $I = \frac{2900}{230}$ I = 12.6… (A)	 allow 13 (A)	1 1 1	AO2 6.2.4.1

Total Question 4	**13**

6.2.1.3 Current, resistance and potential difference

Answer 13 · Mark scheme

June 2023 | 8464/P/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	voltmeter symbol correct and connected across the resistors		1	AO1 6.2.1.3 6.2.1.1 6.2.1.4 RPA15

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	the total resistance must be less than 20 Ω	allow the total resistance cannot be more than 20 Ω	1	AO2
	because the total resistance of the resistors (in parallel) is less than the resistance of the smallest resistor	allow the total resistance of the resistors (in parallel) is less than either resistor	1	AO1 6.2.2 6.2.1.3 RPA15

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	potential difference = current × resistance **or** $V = IR$		1	AO1 6.2.1.3 RPA15

Answer 13 · Mark scheme

June 2023 | 8464/P/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	480 mA = 0.48 A		1	AO2 6.2.1.3
	$V = 0.48 \times 7.5$	allow a correct substitution of an incorrectly / not converted value for current	1	RPA15
	$V = 3.6$ (V)	allow an answer consistent with their incorrectly / not converted value for current	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	x-axis labelled resistance of R in Ω **and** y-axis labelled Total resistance (of resistors) in Ω		1	AO2 6.2.1.3 RPA15
	both points plotted correctly	points must be plotted within ½ small square	1	
	curved line of best fit drawn	allow a line of best fit which ignores an outlier	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	reading from graph consistent with their line of best fit	allow an answer within ½ small square	1	AO3 6.2.1.3 RPA15

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.7	random		1	AO3 6.2.1.3

6.2.1.3 Current, resistance and potential difference

Answer 13 · Mark scheme

June 2023 | 8464/P/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.8	in category A the body water percentage is 61%	allow a value for A between 60% and 62%	1	AO3 6.2.1.3
	in category B the body water percentage is 68%		1	
	if in category A they have a healthy body water percentage **and** if in category B they have an unhealthy body water percentage		1	

Total Question 6	**15**

6.2.1.3 Current, resistance and potential difference

Answer 14 · Mark scheme

June 2024 | 8464/P/1F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	the current in both lamps is the same		1	AO1 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	(4.5 – 1.5 =) 3 (V)	allow (4.5 – 1.5 =) 3.0 (V)	1	AO2 6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	P = 1.5 × 1.2 1.8 (W)		1 1	AO2 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	$R = \frac{1.5}{1.2}$ 1.25 (Ω)	allow 1.3 (Ω)	1 1	AO2 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	Q = 1.2 × 40 48 (C)		1 1	AO2 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	the temperature of each lamp increases		1	AO1 6.2.1.4

6.2.1.3 Current, resistance and potential difference

Answer 14 · Mark scheme

June 2024 | 8464/P/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	lamp **X** no longer emits light because the circuit is no longer complete	 dependent on MP1 allow because there is no current	1 1	AO3 6.2.2

Total Question 1	**11**

Answer 15 · Mark scheme

June 2024 | 8464/P/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	voltmeter symbol correct voltmeter connected across diode	 allow voltmeter connected across diode and ammeter	1 1	AO1 6.2.1 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2			1	AO1 6.2.1 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	random		1	AO3 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	$\frac{0.27 + 0.32 + 0.31}{3}$ 0.3 (A)	 allow 0.30 (A)	1 1	AO2 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	both points plotted correctly line of best fit	allow a tolerance of ± ½ small square ignore line before 0.5 V	1 1	AO2 6.2.1.4 RPA16

6.2.1.3 Current, resistance and potential difference

Answer 15 · Mark scheme

June 2024 | 8464/P/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	non-linear		1	AO2 6.2.1.4 6.2.1.4 RPA16

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	the current decreased to 0.00 A		1	AO1 6.2.1.4 6.2.1.4 RPA16

Total Question 4	**10**

6.2.1.3 Current, resistance and potential difference

Answer 16 · Mark scheme

June 2024 | 8464/P/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	kinetic energy (of the beater / food) internal / thermal energy (of the surroundings / whisk / food)	ignore sound	1 1	AO1 6.2.4.2 6.1.2.1 6.1.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	power = $\frac{\text{work done}}{\text{time}}$ or $P = \frac{W}{t}$		1	AO1 6.1.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	$92 = \frac{23\,000}{\text{time}}$ $\text{time} = \frac{23\,000}{92}$ 250 (s)		1 1 1	AO2 6.1.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	$P = I^2 R$		1	AO1 6.2.4.1

6.2.1.3 Current, resistance and potential difference

Answer 16 · Mark scheme

June 2024 | 8464/P/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	I = 0.500 A $P = 0.500^2 \times 640$ P = 160 (W)	 allow a correct substitution of an incorrectly / not converted current allow a correct calculation using an incorrectly / not converted current	1 1 1	AO2 6.2.4.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	230 (V)		1	AO1 6.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.7	decreases		1	AO1 6.2.4.1

Total Question 6	**12**

6.2.1.3 Current, resistance and potential difference

Answer 17 · Mark scheme

June 2025 | 8464/P/1F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	symbols for filament lamp, ammeter and cell used a simple complete series circuit	allow **1** mark for 2 correct circuit symbols MP3 dependent on scoring at least **1** other mark	2 1	AO1 6.2.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	cell		1	AO1 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	$Q = 1.5 \times 30$ $Q = 45$ (C)		1 1	AO2 6.2.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	$R = \frac{12}{1.5}$ $R = 8$ Ω	 allow 8.0 allow ohms	1 1 1	AO2 AO2 AO1 6.2.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	as potential difference increases, the current increases non-linear relationship	 allow at a decreasing rate	1 1	AO3 6.2.1.4

6.2.1.3 Current, resistance and potential difference

Answer 17 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.6	(resistance) increases		1	AO1 6.2.1.4

Question	Answers	Mark	AO / Spec. Ref.
02.7	**Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	3–4	AO3
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO2 6.2.4.2
	No relevant content	0	
	Indicative content • both types of bulb have equal brightness • the same number of bulbs are needed • LED bulbs do not need to be replaced as often **power comparison** • the input power of filament lamp is greater • the input power of the filament lamp is 32 W greater • the input power of filament lamp is 5 times greater • the brightness per watt for the LED bulb is 100 arbitrary units • the brightness per watt for the filament lamp is 20 arbitrary units **consequence** • LED bulb transfers less energy • (number of units of) electricity used is lower for LED bulb • LED bulb wastes less energy • LED bulb running costs are lower • the LED bulb is more efficient • the LED bulb is 5 times more efficient for **Level 2** answers must include a valid calculation		

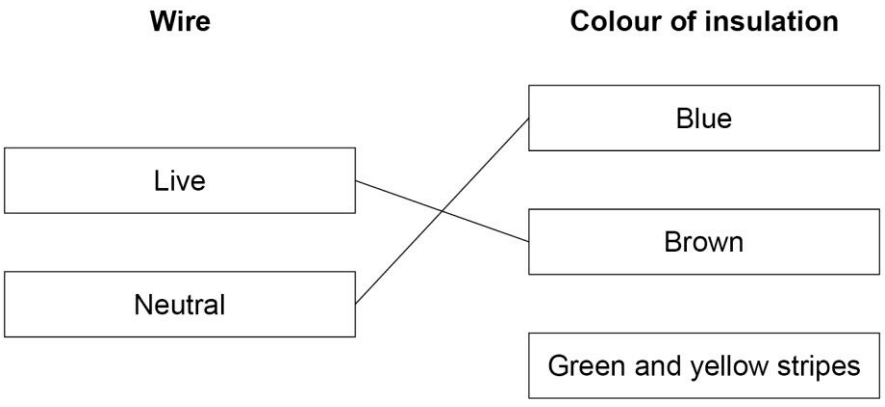
Total Question 2	**16**

6.2.1.3 Current, resistance and potential difference

Answer 18 · Mark scheme June 2025 | 8464/P/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	50 Hz		1	AO1 6.2.3.1

Question	Answers	Mark	AO / Spec. Ref.
04.2	 do **not** accept more than one line from a box on the left	1 1	AO1 6.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	power = potential difference × current **or** $P = VI$		1	AO1 6.2.4.1

6.2.1.3 Current, resistance and potential difference

Answer 18 · Mark scheme June 2025 | 8464/P/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	2100 = 230 × *I*		1	AO2 6.2.4.1
	$I = \frac{2100}{230}$		1	
	I = 9.13…		1	
	I = 9.1 (A)	allow an answer calculated using the numbers from the question given to two significant figures	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	18 000 = 0.0080 × *L*		1	AO2 6.3.2.3
	$L = \frac{18\,000}{0.0080}$		1	
	L = 2 250 000 (J/kg)	allow 2 300 000	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	efficiency = $\frac{75\,600}{84\,000}$		1	AO2 6.1.2.2
	efficiency = 0.9		1	
	OR			
	efficiency = $\frac{75\,600}{84\,000}$ × 100 (1)			
	efficiency = 90% (1)			

6.2.1.3 Current, resistance and potential difference

Answer 18 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	less energy is wasted	allow power for energy throughout	1	AO1
	(so) costs less to run **or** (so) uses less electricity / energy	allow so the appliance is used for less time	1	AO2 6.1.2.1 6.1.2.2 6.2.4.2

Total Question 4	15

6.2.1.3 Current, resistance and potential difference

Answer 03 · Examiner comments

June 2019 | 8464/P/1F | Original Q1

Question 1 (Low demand)

01.1 Slightly below 60% of students recognised the LED in this question.

01.2 Around 33% of students knew that the circuit in the diagram is series circuit, so the current is the same through both components.

01.3 More than half of all students gained both marks. Many who did not score appeared to have read the scale of the graph incorrectly, for example reading 850 thousand and 1450 thousand steps when they should have read 900 thousand and 1500 thousand steps.

01.4 Almost 70% of students knew that checking repeatability requires repeating with the same method.

01.5 A simple calculation using a given formula was well answered with slightly less than 90% of students showing clear working and gaining both marks.

01.6 Fewer than 30% of students knew the formula relating power, current and resistance.

01.7 Almost 90% of students knew that a current would increase the temperature of the resistor.

01.8 This straightforward calculation using a given equation was done well, with clear working shown. Over 90% scored both marks. Some students, however, converted 180 seconds to minutes before calculating the answer.

6.2.1.3 Current, resistance and potential difference

Answer 04 · Examiner comments June 2019 | 8464/P/1F | Original Q2

Question 2

02.1 Nearly 70% of students correctly chose the brightness of the lamp as the control variable.

02.2 This question was correctly answered by just over 30% of students.

02.3 The anomalous result was recognised by about 70% of students.

02.4 Slightly less than half of the students identified the pattern in the data, and used this to predict the most likely value using the information in the table. Many students who didn't score a mark tried to calculate a mean using some data from the table.

02.5 This calculation was answered well, with around four fifths of students dividing the two values correctly and expressing their answer as either a decimal or a percentage.

02.6 Understanding that renewable resources are replenished was shown by three quarters of students.

02.7 Just over 5% of students gained only 1 mark on this question, for correctly substituting the numbers into an equation. Another 80% or so of students completed the calculation, but the ability to express it to two significant figures was shown by only approximately 30% of students. Some students did not try, some rounded incorrectly, but many reduced 15190 to just 15.

02.8 Just over 70% of students knew that using solar panels would reduce the need to burn fossil fuels.

6.2.1.3 Current, resistance and potential difference

Answer 05 · Examiner comments June 2019 | 8464/P/1F | Original Q6

Question 6

06.1 Slightly over 35% of students made the correct choice in this question. Some students who used a computer to type their answer did not gain the mark because they typed answers such as 'the ammeter is in series and the voltmeter in parallel' which could have meant either the third or fourth options in the table.

06.2 Just under one in four students knew that increasing the resistance would cause the current to decrease. Current slowing down was not an acceptable alternative but a reduced rate of flow of charge was accepted. Almost 10% did not attempt the question.

06.3 Although this question is based on a Required Practical Activity, fewer than 5% of students could suggest how to give negative readings on both of the meters. Many students suggested making changes to the other components in the circuit that would not have the desired effect, such as swapping the positions of the meters, adjusting the variable resistor, or adding more resistors. Others suggested using a 'negative battery'. Around 20% of students made no attempt. A small proportion stated that the direction of the current needed to be reversed but did not describe how the circuit should have been changed to achieve this.

06.4 This question required the *type* of relationship; around 5% of students could describe the relationship as proportional or directly proportional; about 15% made no attempt.

06.5 The equation linking current, potential difference and resistance was correctly described by around 35% of students in words or symbols. Many students used lower case letters i, v and r to represent current, potential difference and resistance, which was allowed. Also acceptable was a correct combination of symbols and words. Of those who did not gain the mark, many appeared to be making up their own symbols to represent each of the quantities

06.6 Full marks were scored by just under a quarter of students, but almost 10% of students made no attempt to calculate the resistance.

Answer 08 · Examiner comments November 2021 | 8464/P/1F | Original Q3

Question 3 (Low/standard demand)

03.1 Slightly over half the students knew the symbol for a filament lamp.

03.2 Nearly three quarters of all students answered this correctly.

6.2.1.3 Current, resistance and potential difference

Answer 08 · Examiner comments

November 2021 | 8464/P/1F | Original Q3

03.3 This question was testing whether students were able to draw four components in series. A complete circuit was needed, with no gaps around the components. Many students drew the components at right angles to the wires, and therefore not connected into the circuit. Students were given the symbols in the question, and were expected to draw them correctly, so those who drew a line through the middle of the ammeter, for example, did not gain the mark. Roughly 45% of students gained this mark, with almost 10% not attempting the question at all.

03.4 Just over 40% of students answered correctly, with more than a third opting to place an additional ammeter in the circuit.

03.5 Over 90% gained both marks.

03.6 Just under half the students correctly recalled the equation, but almost 1 student in 8 did not attempt to answer.

03.7 A fair proportion of students attempted to convert 15 seconds into minutes, and then multiplied this by 200, gaining no marks. It was uncommon for students to attempt to convert milliamps into amps. Just over half of all students gained at least 2 marks.

03.8 Many students struggled to answer this question, and less than a quarter of students answered correctly.

03.9 Around than one in ten students selected the correct answer. Roughly a third of students selected the third option, suggesting that the vast majority of these students were not familiar with the ± symbol.

6.2.1.3 Current, resistance and potential difference

Answer 09 · Examiner comments

November 2021 | 8464/P/1F | Original Q5

Question 05 (Standard demand)

05.1 Slightly over a third of students selected the correct equation.

05.2 Full marks were gained by approximately a third of the students, with more than 50% failing to gain any credit.

05.3 This equation was correctly recalled by slightly less than half of students.

05.4 Most students did not attempt to convert 2500 minutes into seconds. Very few students gained all 3 marks, although over 60 % gained at least 2 marks.

05.5 Only a very small proportion of foundation tier students were able to correctly identify the symbol for a thermistor.

05.6 Most students failed to recognise that the resistance of the thermistor would decrease as temperature increased, with many students stating that because the potential different across the thermistor was constant, the current in the thermistor must also be constant. Another misconception demonstrated in a number of responses was that the current would increase because the increased temperature gives the current more energy. Nearly one in five students did not attempt the question.

Answer 10 · Examiner comments

November 2021 | 8464/P/1F | Original Q6

Question 06 (Standard demand)

06.1 This question was answered correctly by roughly one in three students.

06.2 Around 15% of students gained both marks, with slightly over half gaining just one mark.

06.3 Many students gave answers which were too vague, such as “beta radiation is not strong enough”, or stated that beta radiation is not ionising, which is incorrect. Very few students answered correctly.

6.2.1.3 Current, resistance and potential difference

Answer 10 · Examiner comments November 2021 | 8464/P/1F | Original Q6

06.4 Most students struggled to answer this question, with many unable to write answers containing any relevant content. Many answers suggested placing the piece of paper or aluminium into the radioactive source holder, for example. A fair proportion of students did not read the question carefully, and suggested changing the radioactive source to test the equipment using one source of just alpha radiation, one of just beta, and one that emits just gamma radiation, although it was still possible to gain full credit if they did this.

Some students recalled that paper stops alpha radiation, that aluminium stops beta radiation, and that gamma would penetrate both, but didn't describe how to set up the equipment. Others described how to set up the equipment, but not how to use any measurements to draw conclusions.

Nearly a quarter of students did not attempt to answer the question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Answer 11 · Examiner comments

June 2022 | 8464/P/1F | Original Q1

Question 01 (Low demand)

01.1 This multiple-choice question was answered correctly by around 80% of students.

01.2 Slightly more than 40% of students answered this question correctly.

Many students gave the answer of voltmeter, perhaps suggesting that they did not read the word “adjust” in the question.

01.3 Just under 40% of students answered this question correctly.

01.4 Nearly three quarters of all students gained both marks in this calculation.

Some students incorrectly tried to use the number 2.5 in their calculations, for example adding the three currents and dividing by 2.5, or by adding 2.5 V to the sum of the currents before dividing. These responses gained no marks.

01.5 Nearly 90% of students correctly substituted into the equation and calculated the correct answer.

01.6 Almost 90% of students gained both marks for this calculation.

01.7 While almost all students gained at least one mark on this question, only about 15% gave both correct answers.

01.8 Around 60% of students identified the correct graph.

6.2.1.3 Current, resistance and potential difference

Answer 12 · Examiner comments

June 2023 | 8464/P/1F | Original Q4

Question 04 (Low demand and standard demand)

04.1 Slightly more than half the students correctly chose the thermistor, with the variable resistor being the most common incorrect answer.

04.2 Just under 40% of students recognised that current is a flow of charge. The most common answer was that current is a flow of energy, which did not gain any credit.

04.3 About 60% of students scored at least 1 mark on this question, but less than one in ten students gained full marks. Many students just put the thermistor near to the beaker of water or near to the kettle, so that recording the resistance would not give a relevant measurement. Some measured the resistance of the water rather than the resistance of the thermistor. It was not uncommon for students to pour the iced water or boiling water on the ground and then put the thermistor in the ground. Few students organised their answer into a logical sequence.

04.4 Over 40% of students correctly identified the trend as non-linear.

04.5 About half of the students gained both marks for this calculation, with the majority of the remaining students gaining no credit. Many of those who did not score calculated the change in temperature rather than referring to Figure 5 and determining the change in resistance.

04.6 Only about 85% of students correctly wrote down the equation, despite the equation being given on the Equation Sheet this year. Over 5% of students did not attempt this question.

04.7 Nearly 70% of students scored at least one mark, with about 65% gained full marks for this calculation.

6.2.1.3 Current, resistance and potential difference

Answer 13 · Examiner comments June 2023 | 8464/P/1F | Original Q6

Question 06 (Standard demand)

06.1 Less than 10% of students scored this mark, with over 20% of students not attempting this question. It was very common for those who did attempt the question to place the voltmeter on the left side of the circuit in series with the battery.

06.2 Only about 5% of students gained 1 mark or more on this question. It was very common for students to think that resistors in parallel have to have the same value or that the unknown resistor must also be 20 ohms. It was also common to think that the values of the resistors added in parallel. Many students thought that the value of the resistors should be multiplied, but that nothing can be multiplied by 20 to make 26. Very few realised that as resistors are combined in parallel, the total resistance decreases.

06.3 Nearly 90% of students wrote down the correct equation.

06.4 While nearly three quarters of students used the equation and scored 1 or 2 marks, only a very small proportion of students correctly converted milli-amps to amps and gained all 3 marks on this calculation. It was reasonably common for students to recognise that they needed to do this conversion, but to use a factor of 100 rather than 1000. Some students incorrectly decided to double their answer because there were two resistors, which unfortunately led to them gaining no marks for this question.

06.5 About four fifths of students gained at least one mark for plotting the graph, but only about 15% gained all three marks. Some students did not label the axes, and a fair proportion labelled them X and Y. Many thought that the line of best fit should be straight rather than curved.

06.6 Just over a quarter of students gained this mark, which was for reading the value consistent with their line of best fit – whether this was curved or straight – from question 06.5. Many students

6.2.1.3 Current, resistance and potential difference

Answer 13 · Examiner comments June 2023 | 8464/P/1F | Original Q6

who did not score the mark either read from the wrong axis or read values from 4.8 ohms rather than 4.4 ohms because they did not read the scale correctly.

06.7 Very few students could identify this as a random error. The question was not attempted by about 1 in 10 students. Common wrong answers included human error and mechanical errors.

06.8 About a fifth of students gained marks, with another fifth not attempting the question at all. It was reasonably common for students to read the percentage from the ends of the lines and base their evaluation on a reading of 80%, which gained no credit.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Answer 14 · Examiner comments

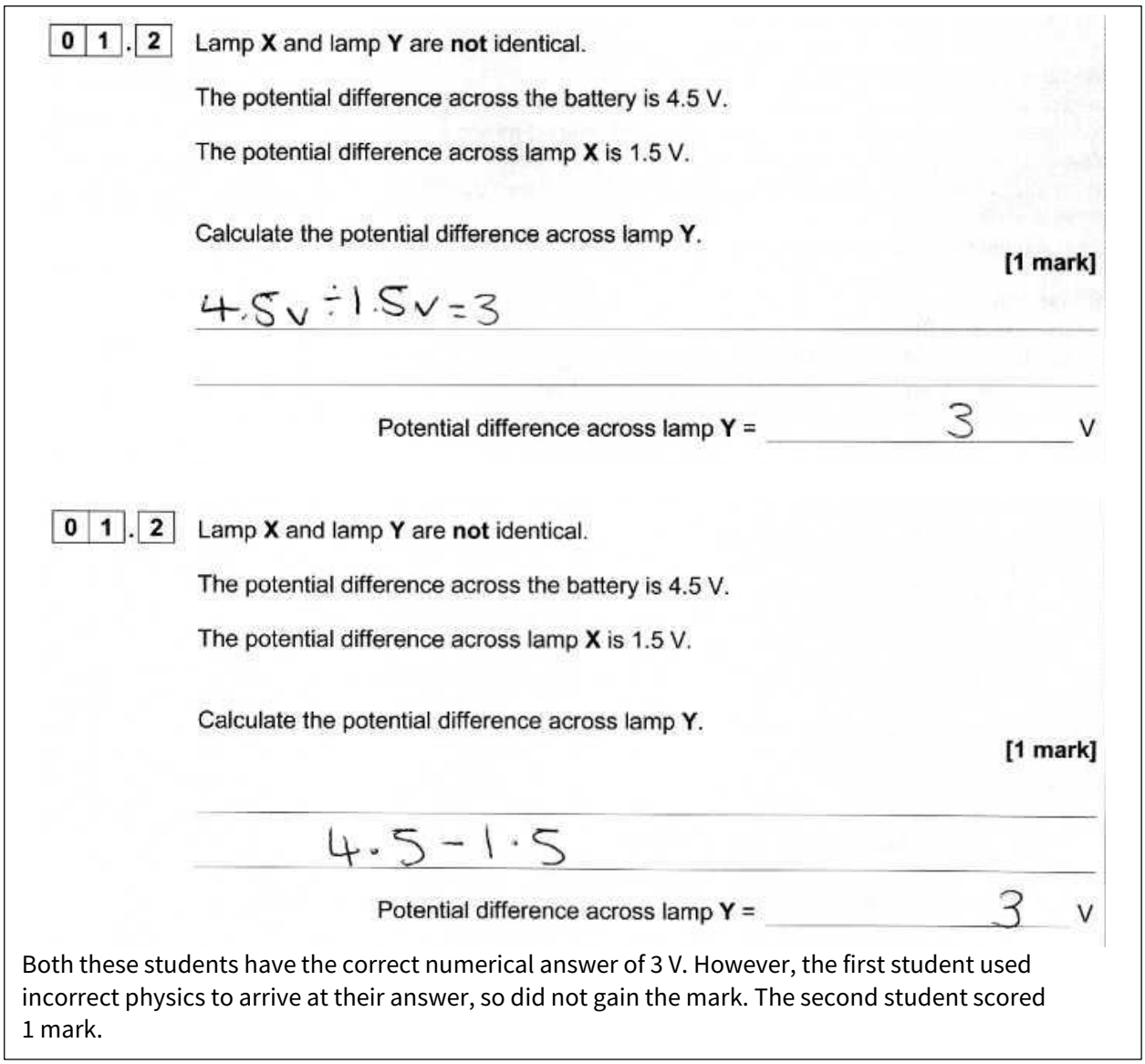
June 2024 | 8464/P/1F | Original Q1

Question 1 (low demand)

01.1 Roughly half of all students recognised that the current in two lamps connected in series is the same.

01.2 Approximately 1 in 2 students answered this question correctly.

Students who demonstrated that they had arrived at the answer of 3.0 V by using incorrect physics did not score this mark. This included those who divided 4.5 V by 1.5 V, and, less commonly, those who calculated a mean of 4.5 V and 1.5 V. If a student gave the correct answer without showing their reasoning, it was assumed that they had used correct physics and the mark was awarded.



0 1 . 2 Lamp **X** and lamp **Y** are **not** identical.

The potential difference across the battery is 4.5 V.

The potential difference across lamp **X** is 1.5 V.

Calculate the potential difference across lamp **Y**.

[1 mark]

4.5v ÷ 1.5v = 3

Potential difference across lamp **Y** = 3 V

0 1 . 2 Lamp **X** and lamp **Y** are **not** identical.

The potential difference across the battery is 4.5 V.

The potential difference across lamp **X** is 1.5 V.

Calculate the potential difference across lamp **Y**.

[1 mark]

4.5 - 1.5

Potential difference across lamp **Y** = 3 V

Both these students have the correct numerical answer of 3 V. However, the first student used incorrect physics to arrive at their answer, so did not gain the mark. The second student scored 1 mark.

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6.2.1.3 Current, resistance and potential difference

Answer 14 · Examiner comments June 2024 | 8464/P/1F | Original Q1

01.3 This question was generally very well answered, with around 90% of students able to substitute into the equation and calculate the correct answer.

01.4 Nearly 85% of all students calculated the correct resistance and gained both marks.

01.5 The majority of students gained full marks on this question.

A common mistake was to divide the 40 seconds by 100, before using the time in the equation given. Students who made this error arrived at an incorrect answer but could still gain a mark if their answer was consistent with the current multiplied by their time.

01.6 Slightly less than a third of students recognised that the resistance of a filament lamp increases because the temperature increases. The most common incorrect answer was from students who stated that the power of the battery increases to cause the resistance of the lamp to increase.

01.7 Approximately 35% of students identified that lamp X would no longer emit light if lamp Y breaks, with a high proportion of students selecting that lamp X would get brighter. Approximately 2 in 5 of those students who selected the correct answer were able to articulate a valid reason for this.

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Answer 15 · Examiner comments

June 2024 | 8464/P/1F | Original Q4

Question 4 (low & standard demand)

04.1 While the majority of students demonstrated that they recalled the symbol for a voltmeter, a small minority were able to position the voltmeter in parallel with the diode.

04.2 Nearly 60% correctly identified the variable resistor as the component that should be used to adjust the potential difference across the diode.

04.3 Around a quarter of students correctly identified that fluctuations in readings, when everything else remained the same, must be examples of random error. The most common answer given was systematic errors.

04.4 This question was generally well answered, with nearly three-quarters of all students gaining both marks. Errors seen from those who did not score any marks included multiplying the numbers together instead of adding them, forgetting to divide the answer by 3, and giving the median value instead of calculating the mean.

04.5 There were many good attempts at drawing the line using a sharp pencil, and clearly marking the points with a cross.

Many students accurately plotted the points on this graph. A lower proportion managed to draw a valid line of best fit, with around 30% of students gaining full marks for the question. A relatively common incorrect attempt at the line was to draw a single straight line.

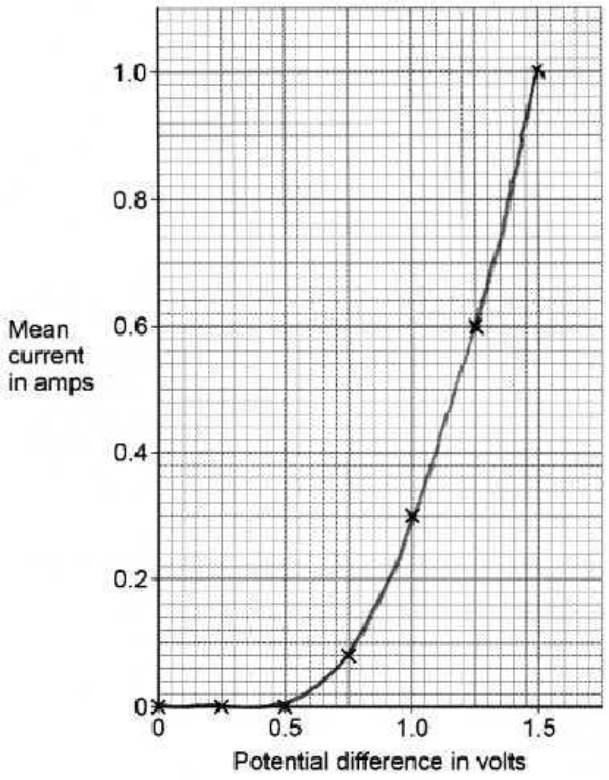
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6.2.1.3 Current, resistance and potential difference

Answer 15 · Examiner comments

Figure 7 shows some of the results.

Figure 7



A good example of a well-plotted graph. This student scored both marks.

04.6 Approximately a third of students correctly described the current-potential difference relationship for a diode as non-linear.

04.7 Slightly less than 40% of students recalled that, when reversed, the current in a diode becomes 0.00 A. Slightly more than 40% ticked the box to suggest that the current would remain the same.

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Answer 16 · Examiner comments

June 2024 | 8464/P/1F | Original Q6

Question 6 (standard demand)

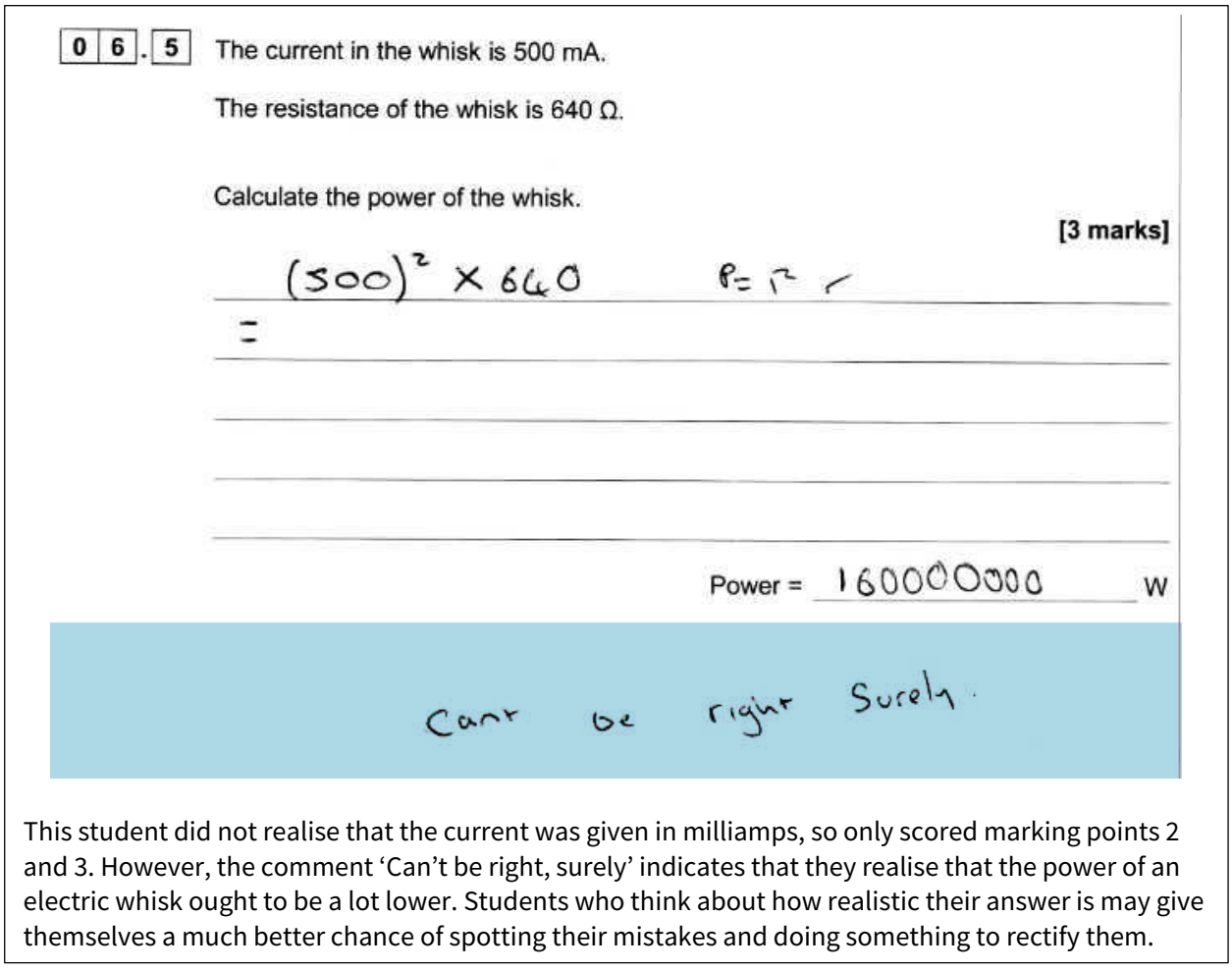
06.1 Roughly two-thirds of students gained at least 1 mark on this question, with about half of these gaining both marks. The most common incorrect answers were an increase in electrical energy and an increase in chemical energy.

06.2 Almost 90% of students wrote the correct equation.

06.3 Over half of all students arrived at the correct final answer, gaining 3 marks.

06.4 Just under 90% of students selected the correct equation.

06.5 For this calculation, very few students correctly converted the current from milliamps into amps. Some students forgot to show that the current should be squared in their substitution. Others showed a valid substitution but forgot to square the current when they entered it in their calculator. Less than 5% scored all 3 marks, but about 65% gained 2 marks on this question.



0 6 . 5 The current in the whisk is 500 mA.

The resistance of the whisk is 640 Ω.

Calculate the power of the whisk.

[3 marks]

$(500)^2 \times 640$ $P = I^2 R$

=

Power = 160000000 W

Can't be right Surely.

This student did not realise that the current was given in milliamps, so only scored marking points 2 and 3. However, the comment 'Can't be right, surely' indicates that they realise that the power of an electric whisk ought to be a lot lower. Students who think about how realistic their answer is may give themselves a much better chance of spotting their mistakes and doing something to rectify them.

06.6 The proportion of students who recalled the potential difference between the live and neutral wires was very low, with less than 15% of students answering correctly.

06.7 Slightly more than half of all students identified that an increase in current would be caused by a decrease in resistance.

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Answer 17 · Examiner comments

June 2025 | 8464/P/1F | Original Q2

Question 2 (Low demand)

02.1 This question discriminated well and produced a good spread of marks. 35% of students gained 3 marks for selecting the correct circuit symbols and drawing a simple complete series circuit. 70% of students made one error and were awarded 2 marks. Most of the students that scored 2 marks selected an incorrect circuit symbol, but some did select them correctly but could not draw a simple complete series circuit. 10% of students gained 1 mark for 2 correct circuit symbols.

02.2 65% of students correctly identified the cell as the source of energy for the circuit.

02.3 This low demand calculation was well answered with 90% of students gaining both marks. Some students did an unusual conversion of time, dividing 30 by 100.

02.4 85% of students correctly calculated the resistance of the filament lamp and gained both calculation marks. The unit mark was awarded independently, and 60% of students selected the correct unit.

02.5 65% of students gained a mark for describing the current increasing as the potential difference increases. Only a small number of students described the relationship as being non-linear.

02.6 Only 30% of students described the resistance of the filament lamp increasing as the temperature increases.

02.7 This question discriminated well and produced a good spread of marks. Approximately 50% of students wrote Level 2 responses and gained either 3 or 4 marks. 40% of students wrote Level 1 responses because they did not include a calculation. Only a very small number of students did not write anything creditworthy, and a very small number did not attempt the question.

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Answer 18 · Examiner comments

June 2025 | 8464/P/1F | Original Q4

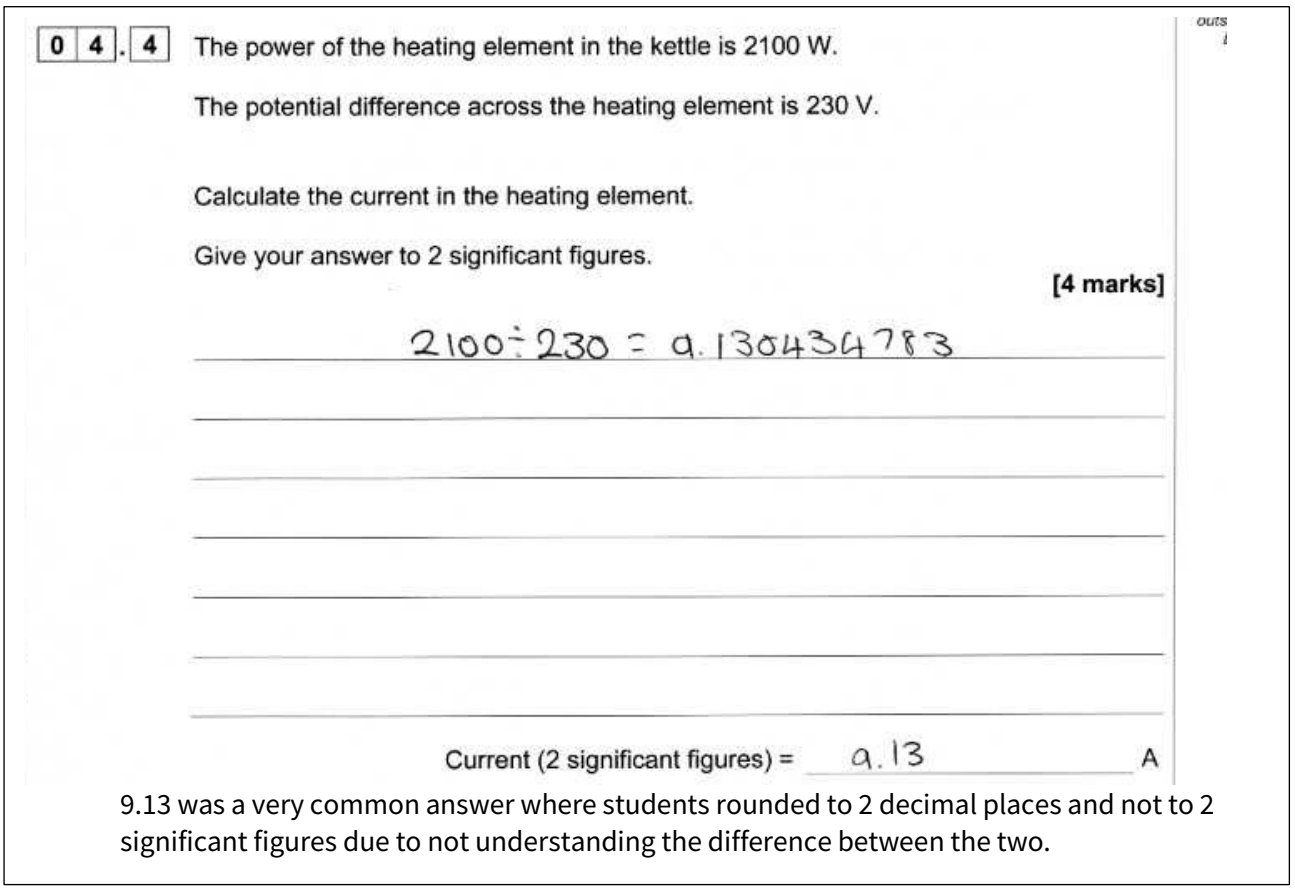
Question 4 (Low and standard demand)

04.1 45% of students selected the correct answer for the frequency of the UK mains electricity supply.

04.2 Just over 20% of students gained 1 mark for correctly identifying the colour of the insulation on one of the wires. 35% of students were able to identify both the colours of the insulation.

04.3 Students now have the equation sheet to select the equation from, so 90% of students gained the mark on this question. Approximately 5% of students selected the incorrect equation.

04.4 The vast majority of students who correctly substituted into the equation scored the 3 calculation marks. Approximately 75% of students gained 3 marks, but only 35% of students gained the mark for the significant figures. Many students gave their answer to 2 decimal places and not to two significant figures.



0 4 . 4 The power of the heating element in the kettle is 2100 W.

The potential difference across the heating element is 230 V.

Calculate the current in the heating element.

Give your answer to 2 significant figures.

[4 marks]

2100 ÷ 230 = 9.130434783

Current (2 significant figures) = 9.13 A

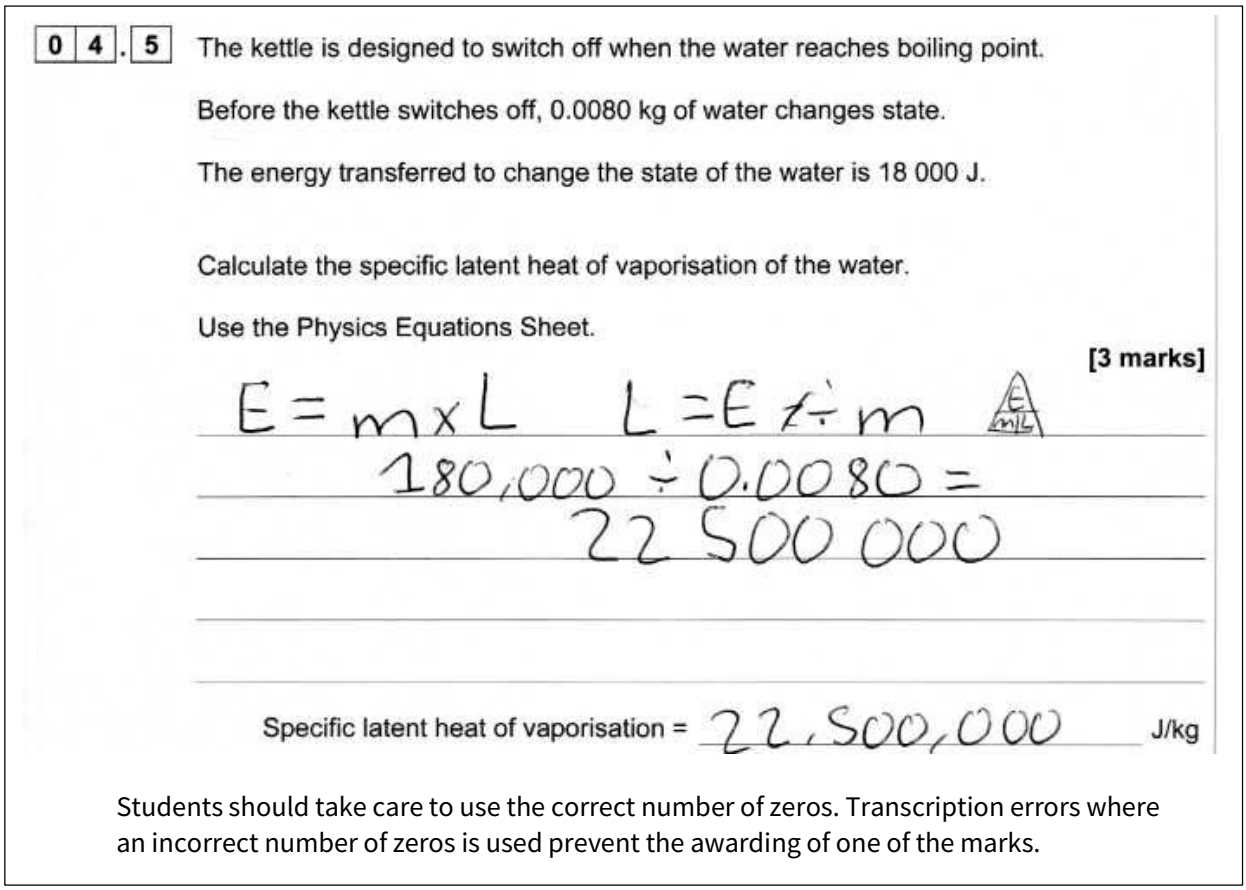
9.13 was a very common answer where students rounded to 2 decimal places and not to 2 significant figures due to not understanding the difference between the two.

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6.2.1.3 Current, resistance and potential difference

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04.5 This calculation proved to be more challenging with approximately 50% of students gaining 3 marks. The vast majority of students who substituted correctly were able to rearrange the equation correctly and then arrive at the correct answer. Most students who did not gain any marks either did not select the correct equation from the equation sheet or did an incorrect initial substitution.



0 4 . 5 The kettle is designed to switch off when the water reaches boiling point.

Before the kettle switches off, 0.0080 kg of water changes state.

The energy transferred to change the state of the water is 18 000 J.

Calculate the specific latent heat of vaporisation of the water.

Use the Physics Equations Sheet.

[3 marks]

$E = m \times L$ $L = E \div m$

$180,000 \div 0.0080 =$

$22\,500\,000$

Specific latent heat of vaporisation = 22,500,000 J/kg

Students should take care to use the correct number of zeros. Transcription errors where an incorrect number of zeros is used prevent the awarding of one of the marks.

04.6 This calculation was well answered with approximately 90% of students gaining 2 marks.

04.7 40% of students gained a mark on this question, but only 3% gained both marks. Very few explained that higher efficiency means less energy is wasted. Many students answered in terms of a kettle due to the previous question and explained that the appliance would complete its task in less time. This was awarded a mark due to the context of the question.

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